conventional processes. Generally, a concrete slab, which itself is made from water, takes approximately 18 months for the moisture to evaporate prior to laying the flooring. A concrete slab with soil below always tends to absorb moisture from higher concentration (e.g., higher moisture content in the soil), to lower concentration (e.g., lower moister content in the wood floor or atmosphere in the space where the flooring is being installed). In general, liquid and dampness defuse into natural wood floorings easily, which may result in a change in the internal structure of the natural wood flooring. For example, moisture from the ground or soil when absorbed by the natural wood flooring typically produces a warping such as swelling or "cupping." Consequently, warping of the natural wood flooring damages the flooring structure and overall appearance.

[0005] Moreover, conventional hardwood flooring requires a thickness of a 3/4 inch or greater. Eco-conscious consumers today are seeking out products that have minimal effect on the environment without having to sacrifice on aesthetic appearance. It would be desirable to design an engineered wood flooring wherein the thickness of the wood required could be reduced thereby minimizing the impact on the environment.

[0006] It is therefore desirable to develop an engineered wood flooring that solves the aforementioned problems associated with conventional hardwood flooring.

BRIEF SUMMARY

~~[0007] The present invention is directed to an engineered wood flooring that reduces or minimises or eliminates the aforementioned disadvantageous associated with the conventional hardwood floorings.~~

[0007] In accordance with one aspect of the present invention there is provided a wood flooring comprising:

a stone-wood composite base layer;

at least one mesh layer embedded within the stone-wood composite base layer; and

a wood veneer layer coupled to a top surface of the stone-wood composite base layer, wherein the stone-wood composite base layer consists of about 40% to about 50% MgO, about 20% to about 45% $MgCl_2$, about 9% wood powder, about 2.5% fiberglass mesh, about 0.5% Fe_2O_3, about 0.5% H_3PO_4, about 0.5% $FeSO_4$, and optionally plastic particles.

[0008] One aspect of the present invention is directed to an engineered wood flooring that may be installed on any floor level, including ground floor and subground floor (basement).

[0009] Yet another aspect of the present invention is directed to an engineered wood flooring that is environmentally friendly by minimizing the amount of natural resources utilized when compared to hardwood flooring.

[0010] The present invention may advantageously provide~~s~~ a stone-wood composite base that substantially retains the moisture, wetness and heat within the stone-wood composite base away from the wood veneer layer. As a result any undesirable effects on the wood veneer layer due to moisture, wetness and/or heat are minimized. Due to the moisture, wetness and heat retaining properties of the stone-wood composite base, the present inventive engineered wood flooring is particularly well suited for rooms exposed to relatively high heat, wetness, humidity and/or moisture such as bathrooms, kitchens, laundry rooms, mud rooms, greenhouses, sunrooms, etc.

[0011] Another aspect of the present inventive stone-wood composite base of the engineered wood flooring is its enhanced sound barrier characteristics in comparison to conventional hardwood flooring.

[0012] Unlike conventional natural wood floorings, embodiments of the present inventive engineered wood flooring do~~es~~ not require any acclimation time, thereby expediting the installation process.

[0013] Yet another desirable aspect of the present engineered wood flooring during concrete application, is elimination of the need, cost and time for installation of a subflooring such as a plywood subfloor. Doing away with the subflooring not only saves times while reducing the overall cost, but also eliminates such complications as elevation differentials between adjacent rooms and areas such as hallways.

[0014] Still another desirable aspect of the present inventive engineered wood flooring is that it may be installed using conventional wood cutting tools.

[0015] One more aspect of the present inventive engineered wood flooring is the ability to manufacture each piece or plank with a tongue-

the exposed surface of the tongue and groove, rather than the floor to be covered.

[0040] Thus, while there have been shown, described, and pointed out fundamental novel features of the invention as applied to a preferred embodiment thereof, it will be understood that various omissions, substitutions, and changes in the form and details of the devices illustrated, and in their operation, may be made by those skilled in the art without departing from the spirit and scope of the invention. For example, it is expressly intended that all combinations of those elements and/or steps that perform substantially the same function, in substantially the same way, to achieve the same results be within the scope of the invention. Substitutions of elements from one described embodiment to another are also fully intended and contemplated. It is also to be understood that the drawings are not necessarily drawn to scale, but that they are merely conceptual in nature. It is the intention, therefore, to be limited only as indicated by the scope of the claims appended hereto.

[0041] Every issued patent, pending patent application, publication, journal article, book or any other reference cited herein is each incorporated by reference in their entirety.

[0042] Any discussion of documents, acts, materials, devices, articles or the like which has been included in this specification is solely for the purpose of providing a context for the present invention. It is not to be taken as an admission that any or all of these matters form part of the prior art base or were common general knowledge in the field relevant to the present invention as it existed in Australia or elsewhere before the priority date of this application.

[0043] Throughout this specification, the word “comprise”, or variations thereof such as “comprises” or “comprising”, will be understood to imply the inclusion of a stated element, integer or step, or group of elements integers or steps, but not the exclusion of any other element, integer or step, or group of elements, integers or steps.

CLAIMS

1. A wood flooring comprising:

a stone-wood composite base layer, the composite layer;

at least one mesh layer embedded within the composite base layer, and

a wood veneer layer coupled to the stone-wood composite base layer.

2. The wood flooring of claim 1, where the wood veneer is adhered to the top surface of the stone-wood composite base layer.

3. The wood flooring of claim 1, where the at least one mesh layer is comprised of fiberglass.

4. The wood flooring as in any of the preceding claims, where the stone-wood composite base layer comprises MgO, $MgCl_2$, wood powder, Fe_2O_3, H_2PO_4, and $FeSO_4$.

5. The wood flooring of claim 4, where the stone-wood composite base layer comprises approximately 40% to approximately 50% MgO, approximately 20% to approximately 45% $MgCl_2$, approximately 9% wood powder, approximately 2.5% fiberglass mesh, approximately 0.5% Fe_2O_3 approximately 0.5% H_3PO_4 and approximately 0.5% $FeSO_4$.

6. The wood flooring of claim 5, where the stone-wood composite base layer comprises approximately 45% MgO.

7. The wood flooring of claim 5, where the stone-wood composite base layer comprises approximately 42% $MgCl_2$.

8. The wood flooring as in any of the preceding claims, further comprising a second mesh layer and a third mesh layer.

9. The wood flooring of claim 8, where at least one mesh layer is embedded adjacent to a bottom surface of the stone-wood composite base layer; the second mesh layer is embedded substantially centered in the middle of the composite base layer; and the third mesh layer is embedded adjacent to a top surface of the composite base layer.

10. The wood flooring of claim 9, where at least one mesh layer is not flush with the bottom surface of the stone-wood composite base layer and the third mesh layer is not flush with the top surface of the stone-wood composite base layer.

11. The wood flooring as in any of the preceding claims, where the stone-wood composite base layer comprises recycled wood particles.

12. The wood flooring as in any of the preceding claims, where the stone-wood composite base layer comprises plastic particles.

13. The wood flooring as in any of the preceding claims, where the at least one mesh layer extends to the edges of the composite base layer.

14. The wood flooring as in any of the preceding claims, where the stone-wood composite base layer includes air pockets, the air pockets configured to substantially retain moisture, wetness, and heat.

15. The wood flooring as in any of the preceding claims, where the at least one mesh layer comprises a simple weave forming holes, the holes sufficiently large enough to allow the stone-wood composite base layer to flow through.

16. The wood flooring as in any of the preceding claims, further comprising interlocking edges disposed at least two opposing sides of the stone-wood composite base layer.

17. The wood flooring of claim 16, where the interlocking edges comprise a tongue on a first side of the stone-wood composite base layer and a groove on a second side of the stone-wood composite base layer, the tongue and groove configured to connect an adjacent piece of the wood flooring.

18. The wood flooring as in any of the preceding claims, where an adhesive layer is disposed between the wood veneer layer and the top surface of the composite layer.

19. The wood flooring of claim 18, where the adhesive layer is a neoprene base adhesive substantially free of water and solvents.

20. The wood flooring of claim 18, where the adhesive layer is a moisture cured urethane adhesive.

21. The wood flooring as in any of the preceding claims, where the overall thickness of the top veneer layer is approximately 2mm; the thickness of the stone-wood composite base layer is approximately 18 mm, and the thickness of the at least one mesh layer is approximately 0.9 mm.

22. A method for manufacturing a wood flooring comprising the steps of:

adhering and pressing a stone-wood composite base layer and a wood veneer layer to form a board;

sanding the surfaces of the board uniformly;

cutting the boards to form locking edges disposed on a first side and a second side of the board;

dehumidifying the boards for approximately 24 hours;

sanding and finishing the board.

23. The method of claim 22, where the stone-wood composite layer is prepared by the following steps:

mixing water with a stone-wood composite powder in a mold to form a mixture, the stone-wood composite powder comprising approximately 45% MgO, approximately 42% $MgCl_2$, approximately 9% wood powder, approximately 2.5% fiberglass mesh, approximately 0.5% Fe_2O_3 approximately 0.5% H_3PO_4 and approximately 0.5% $FeSO_4$;

embedding at least one mesh layer into the mixture;

draining the water from the mixture;

setting the mixture for a predetermined period of time to form a stone-composite board;

drying the stone-composite board for a predetermined period of time;

cutting the stone-composite board to a predetermined size; and

sanding a top surface and a bottom surface of the stone-composite board.

24. The method of claim 22, where the veneer layer is prepared by the following steps:

drying the wood veneer having a Janka rating greater than 1000 to a moisture content ranging between approximately 3% to approximately 5%;

wrapping the wood veneer in plastic; and

dehumidifying the wood veneer.

25. The method of claim 22, where the veneer layer is prepared by dehumidifying a wood veneer having a Janka rating less than 1000 to a moisture content ranging between approximately 6% to approximately 8%.

26. The method of claim 22, where the stone-composite layer and the veneer layer are coupled using a neoprene adhesive.

27. The method of claim 26, where the adhering and pressing step further comprises:

pressing the stone-composite layer and the veneer layer for a period of 24 hours, and

drying the pressed board for approximately four days.

28. The method of claim 22, where the stone composite layer and the veneer layer are coupled using a moisture cured urethane adhesive.

29. The method of claim 28, where the adhering and pressing step further comprises:

pressing the stone-composite layer and the veneer layer for a period of 2 hours, and

drying the pressed board for approximately four days.

CLAIMS

1. A wood flooring comprising:

a stone-wood composite base layer;

at least one mesh layer embedded within the stone-wood composite base layer; and

a wood veneer layer coupled to a top surface of the stone-wood composite base layer, wherein the stone-wood composite base layer consists of about 40% to about 50% MgO, about 20% to about 45% $MgCl_2$, about 9% wood powder, about 2.5% fiberglass mesh, about 0.5% Fe_2O_3, about 0.5% H_3PO_4, about 0.5% $FeSO_4$, and optionally plastic particles.

2. The wood flooring as claimed in claim 1, wherein the at least one mesh layer is comprised of fiberglass.

3. The wood flooring as claimed in any of the preceding claims, wherein the stone-wood composite base layer consists of about 45% MgO, about 42% $MgCl_2$, about 9% wood powder, about 2.5% fiberglass mesh, about 0.5% Fe_2O_3, about 0.5% H_3PO_4, and about 0.5% $FeSO_4$.

4. The wood flooring as claimed in any of the preceding claims, wherein the at least one mesh layer comprises at least a first, a second and a third mesh layers which are spaced apart from one another and embedded within the stone-wood composite base layer.

5. The wood flooring as claimed in any of the preceding claims, wherein the stone-wood composite base layer comprises plastic particles.

6. The wood flooring as claimed in any of the preceding claims, wherein the stone-wood composite base layer includes air pockets, the air pockets configured to substantially retain moisture and heat.

7. The wood flooring as claimed in claim 1, wherein the stone-wood composite base layer has interlocking edges comprising a tongue on a first

side of the stone-wood composite base layer and a groove on a second side of the stone-wood composite base layer, the tongue and groove configured to connect an adjacent piece of the wood flooring.

8. The wood flooring as claimed in any of the preceding claims, wherein an adhesive layer is disposed between the wood veneer layer and the top surface of the stone-wood composite base layer, the adhesive layer selected from the group consisting of:

a neoprene base adhesive substantially free of water and solvents; and

a moisture cured urethane adhesive.

9. The wood flooring as claimed in any of the preceding claims, wherein the overall thickness of the top wood veneer layer is approximately 2 mm; the thickness of the stone-wood composite base layer is approximately 18 mm; and the thickness of the at least one mesh layer is approximately 0.9 mm.

10. A method for manufacturing wood flooring comprising the steps of:

adhering and pressing a stone-wood composite base layer and a wood veneer layer to form a board; wherein at least one mesh layer is embedded within the composite base layer;

sanding the surfaces of the board uniformly;

cutting the boards to form locking edges disposed on a first side and a second side of the board;

dehumidifying the boards for about 24 hours; and

sanding and finishing the board.

11. The method as claimed in claim 10, further comprising preparing the stone-wood composite layer by:

mixing water with a stone-wood composite powder in a mold to form a mixture, the stone-wood composite powder consisting of approximately 45%

MgO, approximately 42% $MgCl_2$, approximately 9% wood powder, approximately 2.5% fiberglass mesh, approximately 0.5% Fe_2O_3, approximately 0.5% H_3PO_4, and approximately 0.5% $FeSO_4$;

embedding at least one mesh layer into the mixture;

draining the water from the mixture;

setting the mixture for a predetermined period of time to form a stone-composite board;

drying the stone-composite board for a predetermined period of time;

cutting the stone-composite board to a predetermined size; and

sanding a top surface and a bottom surface of the stone-composite board.

12. The method as claimed in any one of claims 10 and 11, further comprising preparing the veneer layer by:

drying the wood veneer having a Janka rating greater than 1000 to a moisture content ranging between approximately 3% to approximately 5%;

wrapping the wood veneer in plastic; and

dehumidifying the wood veneer.

13. The method as claimed in any one of claims 10, 11 and 12, further comprising preparing the veneer by dehumidifying a wood veneer having a Janka rating less than 1000 to a moisture content ranging between approximately 6% to approximately 8%.

14. The method as claimed in any one of claims 10, 11, 12 and 13, wherein the adhering and pressing step further comprises:

applying an adhesive between the stone-composite layer and the veneer layer;

pressing the stone-composite base layer and the veneer layer together for a period of about 24 hours; and

drying the pressed board for approximately four days.